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Mr. Lubin is Government Affairs – Vice President at AT&T. He is responsible for developing public policy at the federal and state levels. In particular, he formulates regulatory policies associated with access charges, universal service, local exchange competition and LEC regulation.

Mr. Lubin has over thirty five years experience with AT&T. He started with Bell Telephone Laboratories in 1969 developing computer models to solve business problems. In 1972 he transferred to Long Lines, a department of AT&T, where he held various positions conducting economic analysis on telecommunications issues, and developing computer systems to support AT&T's national sales force.

From 1984 to the present, Mr. Lubin has taken on major telecommunications industry issues that required directing the development of economic analysis, formulating public policy positions and advocating those positions to federal and state regulators. In addition, Mr. Lubin managed, directed and led large interdepartmental teams addressing these complex problems. Finally, he has represented AT&T in various external coalitions, and negotiated solutions to complex industry problems.

Mr. Lubin has testified before the FCC, Federal-State Joint Boards, and Congressional Committees on numerous occasions addressing both access and universal service issues. He was also appointed by the Federal-State Joint Board to participate in a multi-year Rural Task Force to address universal service issues associated with rural telephone companies. Mr. Lubin is serving a second term on the Universal Service Administration Company (USAC) Board and is the Vice Chairman of the USAC Board.

Mr. Lubin received a BA degree in Mathematics from Wilkes University in 1969. He also earned an MS Degree in Operations Research/Engineering Methods from Columbia University in 1973 and an MBA from Fordham University in 1976.

JOINT BOARD EN BANC HEARING

Wednesday, November 17, 2004

Panel 1

Good afternoon. I want to thank the members of the Joint Board for putting this Hearing together, and allowing me to participate on this Panel. Before I address the questions asked of this Panel, I'd like to put the issues of this proceeding into the appropriate perspective.

In anticipation of the end on June 30, 2006 of the "interim plan" adopted in the *Rural Task Force Order*, the Commission asked the Joint Board to undertake a review of what measures should succeed the RTF plan and how rural and non-rural high-cost support mechanisms should function together, the so-called "harmonization" of rural and non-rural support. Specifically, this Panel has been asked to comment on the cost standard for measuring rural carrier support, and whether the standard should be forward-looking economic costs as is the case with non-rural support, or whether it should continue to be based on embedded costs.

But before limited resources are expended on this effort, there is another kind of harmonization that *urgently* requires the Commission's attention. I speak, obviously, of the critical need to harmonize the disparate rules under which carriers compensate each other for terminating each other's traffic. The patchwork of different intercarrier compensation schemes, resulting from legacy regulatory classifications such as "local",

"toll", "EAS", "CMRS", "enhanced", "interstate", "intrastate", "interLATA","intraLATA", "intraMTA", *etc.*, is fundamentally broken.

Moreover, the sustainability of universal service is jeopardized by the continued reliance on implicit support contained in both retail and intercarrier rates. For example, implicit support for universal service from interstate access is eroding as customers shift from traditional wireline long distance to wireless "one rate" plans and VoIP. Indeed, over the last four years, the interstate access minutes of the largest ILECs have fallen by more than 25 percent. Intrastate access minutes have probably fallen by a similar amount. Even the federal Universal Service Fund, although explicit, relies on an unstable funding base due to the same legacy regulatory classifications. The regulatory distinctions between "interstate" and "intrastate" services, and between "telecommunications services" and "information services" have become increasingly blurred with the proliferation of various service bundles. As a result, the federal USF assessment base is declining as customers shift to carriers and services that minimize contributions to USF.

As you are aware, ICF has proposed a *comprehensive* plan to move intercarrier compensation regulation and universal service from upheaval to stability. The plan will eliminate today's multiple rate structures for intercarrier compensation, and replace them with a single unified rate structure. As for universal service, the plan eliminates implicit support from access rates and replaces today's revenue-based USF contribution mechanism with a hybrid telephone number-/connection-based mechanism.

First, ICF is a carefully balanced plan, not favoring any particular industry segment. For example, the plan creates two new explicit support mechanisms, one for non-rural carriers and one for rural carriers, recognizing the cost and competitive differences between these entities. Second, the plan is comprehensive, addressing approximately $10 B of intercarrier compensation revenues, compared with the less than $1.2 B of High Cost Loop Support support. Finally, the plan reforms the federal USF contribution mechanism, which is essential, especially if the outcome of this preceding were to result in increases in rural high-cost support. I believe that these problems need to be fixed before spending resources to modify the existing High Cost programs.

Moreover, the ICF addresses many of the questions being asked of this and the other Panel. For example, the Plan calls for the continued calculation of ILEC support (other than IAS and HCM Support) to be based on ILEC embedded costs. Competitive ETCs will initially receive the same amount of support per eligible line as the ILEC, and remain unaffected by reductions in ILEC demand. Thereafter, the Competitive ETC's per line support will increase or decrease in the same proportion as the applicable ILEC revenue requirement. With regard to sales of exchanges, the Safety Valve for High Cost Loop Support is modified to enable the buyer to be eligible for Safety Valve Support immediately following the acquisition of rural exchanges. High Cost Loop Support is further modified with the elimination of the nationwide indexed cap, the unfreezing of the National Average Unseparated Loop Cost Per Working Loop, and the elimination of the different support percentages based on study area size. While ICF does not specifically

address the study area versus statewide averaging question or changes to the definition of Rural Telephone Company, surely the landscape will be significantly altered by ICF.

Another reason to tread slowly in this proceeding is that it is so highly dependent upon the outcome of the current *ETC Designation* docket. Let me explain why. The Joint Board, and this Panel, have been asked to recommend the cost standard for determining rural carrier support. The selection of the cost standard, whether it be forward-looking or embedded, is important for determining *portable* per-line support between ETCs. AT&T has strongly advocated, and the Commission has agreed, that forward-looking costs are the most competitively neutral measure of portable support. First, forward-looking costs are technology neutral, reflecting the latest and most efficient technology required to provide universal service. Second, forward-looking costs are not beholden to any particular carrier's costs of providing universal service, whether it be that of the incumbent or the competitive ETC. Yet, the record is overwhelming with criticisms of forward-looking costs, and the Synthesis Model in particular, with respect to its ability to adequately capture the wide disparity in rural study area costs. That is the crux of this investigation.

I, on the other hand, ask a different question. What if high-cost support were *not* portable? What if multiple ETCs in some rural study areas were determined *not* to be in the public interest? Then, for those study areas, it would not be necessary to replace the current embedded cost standard with one based on forward-looking costs. Why? Because the support would *not be portable*. In the *ETC Designation* proceeding, AT&T

advocated the establishment of a benchmark of high-cost support per line, above which there would be a rebuttable presumption that a study area served by a rate-of-return regulated incumbent LEC will be limited to one ETC. For those study areas with per-line support above the benchmark, the support would be *de facto* not portable. Thus, there is no need to replace the cost standard in those study areas.

Certainly, this proceeding should wait for a Commission ruling in the *ETC Designation* docket, if for no other reason than to find out where deployment of resources to measure forward-looking costs are truly necessary.

In sum, I believe the Joint Board should proceed very cautiously with this investigation, and should certainly not require the devotion of resources, whether they be state or federal regulatory or industry resources, prior to implementation of the ICF plan and Commission order on the *ETC Designation* docket.

Thank you and I'll be glad to answer your questions.

Dennis Weller is Chief Economist of Verizon. Prior to his association with Verizon, Mr. Weller was employed by GTE and by AT&T, where he was involved in issues of pricing, inter-carrier compensation, new service development, and universal service, among others. Mr. Weller did his graduate study in economics at Stanford University.

Statement of Dennis Weller

Chief Economist, Verizon

En Banc Hearing of the

Federal-State Joint Board on Universal Service

Nashville, November 17 2004

Good afternoon madam chairman and commissioners. I appreciate the opportunity to participate this afternoon in the discussion on how the current federal high cost funding mechanisms should be revised to prepare them for an environment that will change rapidly over the coming years.

The concerns raised during the last few weeks over the application of federal accounting rules to the school and library fund have served notice that we cannot assume anything about our ability to maintain the status quo. While I hope that the accounting issues can be addressed without too much disruption to the funds, this experience should prompt us to take the steps necessary to ensure that we can continue to achieve our policy goals for universal service in the future. I envision this taking place in two phases.

First, there are measures that the Commission should adopt in its current proceedings to ensure that the universal service mechanisms can be maintained over the medium term – for the next five years or so. I will make some specific recommendations on these in this statement.

Second, I believe that for the longer term – beyond five years, the existing methods for supporting universal service will no longer be viable, given the development of new, next-generation networks and rapid changes in the

marketplace. Because our commitment to universal service will continue, we will have to consider new policy tools for achieving those goals in the new environment. At the end of this statement, I will attempt to sketch out the direction a new policy framework might take.

Contribution mechanism for the medium term

Today we are skating near the limits of the size of the federal mechanism we can reasonably support on the basis of carrier contributions. This is the case no matter what basis is used for calculating those contributions – revenues, connections, phone numbers, or something else. We should therefore take care to avoid any unreasonable expectations as to what this funding mechanism can accomplish. For reasons I will describe more fully below, whatever we adopt now will be a transitional device, not a long term solution to universal service funding. It will buy us time to develop a long term solution. For similar reasons, we should be very reluctant to add major new burdens, such as the replacement of significant portions of the revenue carriers now obtain from access charges, on top of the obligations this mechanism will already have to fund.

Disbursement of the rural high cost fund in the medium term

Because we are near the limit of what a carrier contribution approach to funding can sustain, the Commission's focus over the near and medium term must be to limit the size of the federal mechanisms, and particularly of the largest component, the rural high cost fund. Left unchecked, growth in the fund over the next few years could undermine the stability of the current system. While parties in the Commission's proceeding continue to debate who is most responsible for

the growth we have observed in recent years, that is really quite irrelevant to the determination of policy going forward. We should identify each potential source of growth and ensure that the new funding mechanism is designed to address all of them.

We should expect the new disbursement method to provide incentives for all ETCs to operate efficiently. At the same time, it should reflect reasonable expectations about what it costs to serve in rural areas, based on actual experience.

The designation of competitive ETCs in rural areas can impose costs on the system in two different ways, each of which will need to be addressed by any new disbursement mechanism. The first source of additional cost comes through substitution of lines between the competing ETCs. As the incumbent loses lines to a new entrant, its costs do not fall proportionally, and its revenue requirement per line increases as it loses economies of density. This is the classic, and expected, cost of supporting duplicate networks in an area where the market may have difficulty maintaining one. Under the current plan, the higher revenue per line is translated into higher per-line support in subsequent periods.

The second source of additional cost was perhaps not so widely anticipated when the current plan was adopted, but has turned out to be quite significant. Wireless carriers provide a service that is both a competitor for and a complement to traditional wireline local service. Wireless carriers have also developed a different business model, in which separate handsets are marketed to each member of a household. Where the additional ETCs are wireless

carriers, many households have responded, not by switching from one provider to the other, but by increasing the total amount of service they buy. A family that previously had one line may now choose to purchase five wireless handsets while keeping the same wireline connection. Since we now distribute support on a per-line basis, the total amount of subsidized service consumed by this household will increase by a factor of six. Because of this complementarity, what was intended to create competition for the existing service has instead created the opportunity to consume greater quantities of service at subsidized prices. While consumers are making reasoned choices when presented with this opportunity, we are simply not in a position to fund such a large expansion of the entitlement provided by the federal universal service mechanism. This issue, which is separate and distinct from the duplication of networks, must be addressed squarely by any new disbursement method. Simply put, we need to separate the amount of universal service funding consumers receive from their choice of carrier, so that consumers cannot draw more subsidy by choosing a different combination of services or providers.

Specific recommendations

In order to address the concerns I have just laid out, several specific changes should be made to the method for disbursing federal high cost funds in rural areas.

First, the Commission should establish a rebuttable presumption that only one ETC should be designated in any rural service area. This would address the problem of duplication at its source, and would deal with the complementarity

issue as well. In effect, the Commission would reach a basic finding that, as a general matter, the cost, in terms of the additional expenditure of federal funds, of supporting an additional network in a rural areas is greater than the benefits that might reasonably be expected from competition in that market between ETCs. While the Commission, or a state, could designate additional ETCs where warranted by special conditions, they would have to overcome this presumption in order to do so.

Second, in any rural service area where a competitive ETC has been designated, support should be limited to the primary line. To implement this proposal, USAC should be directed to survey households in that area to determine their primary line designation. While this unavoidably creates a certain amount of administrative burden, it will only be necessary in those rural service areas where the presumption against additional ETCs has been overcome. In effect, the first line of defense against unreasonable growth in the fund should be to have a single ETC in each rural area. Where that presumption is overcome, then some second line of defense is needed to prevent increases resulting from the complementarity effect I have just described. I propose that a primary line methodology should be used for this purpose. Any cost of administering the primary line approach should be weighed when considering whether to overcome the rebuttable presumption against a second ETC.

Third, the per-line support amount in each rural service area should be established at the outset of any new plan, based on the incumbent ILEC's actual loop cost in the prior twelve-month period. Going forward, the per-line support

should not follow subsequent changes in the ILEC's revenue requirement, but should instead be indexed to reflect inflation, as the cap on fund is today.. This would provide every rural ETC with incentives to operate efficiently, and would also ensure that per-line support would not increase as a result of customers switching from one ETC to the other, as is the case with the current plan. At the same time, the baseline for this indexed support amount would be the amount of cost actually incurred to provide service in that area, not some arbitrary cost estimate. This feature would be similar to one proposed by the Rural Task Force, but not implemented. It would also be similar in its operation to the current cap on the high cost fund. However, unlike the current method, this one would apply to all ETCs. Further, indexing the per-line amount in each area will provide more direct efficiency incentives for each ETC than the current plan, under which a new expenditure by ETC A in year one will affect the support of ETC B in year two.

Fourth, we should recognize that larger rural ETCs have characteristics that are more comparable to those of non-rural ETCs, and modify the plan accordingly. To this end, where an ETC operates more than one study area within a given state, these should be combined for purposes of determining disbursement from the high cost fund. While the current definition of "rural" study areas should, in general, be maintained, those ETCs that serve more than 100,000 lines in a state should be included in the non-rural high cost funding mechanism, even where some of the study areas in that state served by that ETC would, if evaluated separately, be considered rural. These changes would

reduce Verizon's receipts by about $7 million per year. If we look at the characteristics of the companies that serve more than 100,000 rural lines in a state, such as the size of the company, the density of the service areas, and the average level of investment per loop in those areas, they are much closer to those of non-rural carriers than they are to those of the smaller rural ETCs. Treating these larger carriers as non-rural for high cost funding purposes will establish parity of treatment for all ETCs that share these characteristics, while at the same time preserving the limited funds available for those smaller rural carriers whose situations really are quite different. Finally, I should note that, where mid-size companies have purchased lines from larger companies, their current receipts are already limited by existing Commission policy, so that what I am proposing here will not impose any severe shocks for those service areas. There are already various escape-hatch provisions in the current plan, such as the safety valve, to deal with unusual circumstances, and similar provisions could be used again here.

Diversions and cul-de-sacs

Taken together, I believe that the proposals I have outlined here will allow the federal high cost funding mechanisms to fulfill their policy goals, at least for the near-to-mid term, say for the next five years. However, there are a few proposals that have been advanced that I do not believe will contribute to this goal, and which would represent diversions from our forward progress. I will discuss three of these briefly here.

When the Commission first decided to bifurcate the high cost funding mechanism between rural and non-rural areas, it contemplated the possibility of applying a forward-looking cost model to rural funding at some point. This idea has now been set for comment in the recent Notice, and several parties have advocated funding approaches based on a cost model.

While Verizon has not yet taken a position on this question, I would certainly have serious misgivings about going down that road. We all know, from our shared experience with models over the last few years, that the development of a forward-looking cost model for rural areas would be a long, resource-intensive, and contentious process. We also know that such models are highly sensitive to choices made with respect to model structure and inputs, and that any model results will contain significant amounts of error. To what end would we choose to embark on this process? If the objective is to improve incentives for efficiency, I believe that the relatively simple changes I have proposed to the operation of the fund would serve the same goal much more simply, and more effectively. A forward-looking cost model simply doesn't bring any information to the party that would justify the time, effort, and argument that it would entail. Given the rapid development of markets and technology, I believe that it is far too late in the day for the Commission to begin a new effort to prescribe cost estimates for the industry. Far better to accept, and make use of, the real information on actual expenditures by area. On a going-forward basis, the incentive structure of the plan can be improved by relatively straightforward approaches of capping and indexing the support. This approach is far more

parsimonious in its use of information, and less susceptible to error. It will elicit information from the industry, rather than try to impose information on it. The Commission has achieved good results in this way from incentive regulation, and the lessons learned from that experience should be brought to bear here.

On a related topic, the suggestion has been made by several parties to compensate each ETC in a service area on the basis of its "own costs." I believe that this is a bad idea. As a threshold matter, I have proposed that the Commission make a general finding that additional ETCs should not be certified in rural areas. If adopted, this would make the "carrier's own costs" idea moot in most rural areas. However, even if one did wish to think in terms of competition between ETCs, the last thing you would want to do would be to pay different support amounts to ETCs in the same area.

In a normal competitive market, it is not unusual for firms to have different cost structures. One firm may be more efficient, or may provide a somewhat different product. These differences are then reflected in the competitive outcome – and we want them to be. Assume for a moment that we had perfect information about the differences in cost between two ETCs. If we reflect those differences in the support we pay, then we are, in effect, attempting to "handicap" the competition between the two ETCs in such a way as to erase the cost difference. What possible benefit could come from this? The picture becomes even more cloudy when we remove the assumption about perfect information. Now we have to develop two cost models, and all of the cautions I have listed above apply doubly. (Actually, there will be more than two possible technologies,

so additional models might be required.) Since both models will have considerable error, we will now handicap the two ETCs by a more or less random amount that reflects the relative errors in the two models.

I am sure that some rural carriers have advanced this proposal out of a sincere desire to limit the growth of the fund, based on the assumption that the costs estimated for a wireless ETC will be lower. But the same issues of density and distance that affect wireline costs also affect wireless costs in rural areas. And the wireless termination rates in many countries give evidence that a forward-looking model of a wireless network can be made to yield rather high cost estimates. So it is far from clear that, at the end of the day, the "carriers' own costs" approach would generate any meaningful savings.

The problem with this approach is easily demonstrated if, as may be the case in some areas, the competitive ETC's costs are higher than those of the incumbents. In that instance, would we argue that the universal service fund should subsidize an inefficient competitor, regardless of the cost?

I believe that the best way to limit the costs created by duplicate networks in rural areas is to limit the designation of ETCs to one per area in most places. Where we do choose to have more that one ETC we should compensate them on the same basis, using the method I have outline above. Once a support amount has been determined, then each ETC, and each consumer, can make choices with respect to different technologies, without being guided by handicappers at the Commission.

Finally, we are all aware of the problems that surround our current system of inter-carrier compensation. Discussing them here in any detail would take me far outside the scope of this hearing. I do feel compelled to mention them because there is a great temptation, when thinking about inter-carrier compensation, to solve problems there by "exporting" them to the world of universal service. The ICF proposal does that, as do several plans advanced by other parties. We are here today because universal service has problems of its own, and in the current setting it doesn't have much capacity to take on many more. As I will explain in the next section, in the longer run I believe that the development of next-generation networks will force us to rethink universal service more globally, and at that point the revenues that are now generated by access charges will become part of that discussion. But given the limited tools at our disposal in the near term, I am not sure that we can make ourselves better off by bringing that conversation forward into the present. It would be better for us to make some immediate decisions that would shore up the contribution for a few years, limit the growth of the fund, and then devote our attention to the greater challenges that will present themselves over the longer term.

Challenges in the longer term.

I believe that it would be a mistake to assume that the changes to the federal universal service mechanisms we are discussing here, whatever form they may take, will see us through for any long period of time. Changes are already well under way in the industry that will require us to rethink universal

service once again. A new approach might be needed in about five years or so, which is about how much time it would probably take to effect the necessary changes, given that legislation might well be required. To deal with the new environment, the basic framework we have used – a defined service to be supported, carrier contributions, and a fund that writes checks every month – will probably not be relevant. We will have to think of something new.

I don't pretend to know precisely what the right answer will turn out to be, and detailed speculation on that subject would take me far beyond the scope of this hearing. However, I think it is useful to sketch some broad outlines briefly here, to serve as a frame for our present discussion. It is also, I believe, a useful antidote to claims that one or the other of the current proposals is "comprehensive," or will solve all problems.

Today, small rural carriers rely on three sources of revenue: their own end users, access charges, and universal service. For some ETCs, the last two sources may represent as much as seventy percent of their revenue. We are already witnessing the development of a new generation of networks. They will be broadband, highly capable, and based on IP. While these networks are growing more rapidly today in more urban areas, they will eventually be adopted in rural areas as well. I believe that they will change the landscape in a number of ways that will affect universal service.

As more and more traffic is carried on an IP basis, more traffic will be exchanged between carriers that way as well. Today, the exchange of traffic between Internet backbones lies outside the scope of the rules that apply to

circuit-switched traffic. These backbones negotiate arrangements on a commercial basis, without regulatory intervention. No intervention is needed because these networks don't have an obligation to interconnect. If they don't agree, they don't interconnect. In IP space, that's an acceptable outcome, because there are many routing options for packets to get where they need to go, and IP networks don't have to be bilaterally interconnected to ensure universal connectivity.

As these IP arrangements affect a larger proportion of the traffic in the industry, there will be a corresponding shift in the flow of money. A diminishing proportion of the traffic will pay access charges. Over time, instead of receiving a large inflow of payments from other carriers, rural networks may find that they must pay transit charges to secure interconnection arrangements with larger backbones. This, of course, is something we will have to take into account in designing a new framework for universal service over the long run.

At the same time, this same process through which the world of telecom merges with the world of the Internet will also erode our ability to maintain the current system of carrier contributions. Simply put, what we have today is a sector-specific tax. That works as long as you can define the sector. When telecommunications is part of the larger Internet, what part of the Internet do you tax?

If we look at other countries, we find that the majority of them fund universal service based on some form of general taxation. Here in the US, that approach will pose difficulties, both practical and political, but I believe that in the

long run we will be driven by circumstances to consider general revenue funding, just as other countries have done.

Finally, our current system is based on a defined universal service, which we then seek to make widely available at rates that are affordable and reasonably comparable. We do this by providing a funding source which, for ILECs, is closely tied to the traditional regulation of those carriers. I believe that the development of a new generation of networks will push us to reconsider that framework. The thing that will be costly will be building that new infrastructure in rural areas. That is what we should subsidize, and we should consider doing that directly, perhaps through a mechanism that looks more like an RUS grant than a regular check from USAC.

A funding approach along these lines would recognize the reality that, in this new world, services need not be tied to the networks that provide them. As long as a rural customer has a broadband connection, the voice service he or she subscribes to could come from anywhere, perhaps from a VOIP provider in Estonia. Unless we want to get into the business of sending USF checks to Estonia, we had better think about separating support for networks from the services that ride over them. This approach would obviate the ongoing discussion of whether broadband should be added to the definition of the supported service. It would also allow regulation to be more limited, and provide rural infrastructure providers with some of the same incentives their urban counterparts will have – to innovate, and to find more ways to use their new networks to deliver value to their customers.

I know that much of this may sound speculative, and it is. But the speed of change in our business is there for all to see. Given the speed with which we have been able to devise new policy frameworks in the recent past, I suggest that it is none too soon for us to begin thinking about where we will want to be when we grow up. I think it is also healthy for us to recognize that, in the Commission's current deliberation, we are not seeking to adopt policy for the ages, but rather to patch together the current system, so that it can survive until such time as longer-term changes may be possible.

Madam chairman, I thank you again for the chance to participate in today's hearing, and I look for ward to your questions.

DALE LEHMAN
Biographical Statement

Dale Lehman is Director of the MBA program in Telecommunications Management at Alaska Pacific University. He has taught at 10 universities and held positions at Bellcore and Southwestern Bell. He received his BA in Economics from SUNY at Stony Brook and his MA and PhD degrees in Economics from the University of Rochester. He has published and consulted widely in the areas of demand analysis, cost analysis, and public policy in telecommunications.

Written Statement of Dale E. Lehman

Support in Areas Served by Rural Carriers and the Definition of "Rural Telephone Company"

Before the Federal-State Joint Board on Universal Service

Nashville, Tennessee Wednesday, November 17, 2004

Section 254 of the Act contains principles to govern the methodology used for determining USF support. These call for comparable services at comparable rates in high cost regions of the country and support mechanisms that are specific, predictable, and sufficient. Ensuring that rural carriers achieve cost minimization is important, but only in that it serves these purposes. Application of forward-looking costs for determining USF support for rural ILECs would jeopardize the sufficiency and predictability of that support. Any purported reduction in the cost of providing universal service must be weighted against the potential loss in the quality of services available in rural areas. Critically, forward-looking costs must be validated and require *evidence* of rural ILEC inefficiency.[1]

The Relationship between Embedded Cost and Forward-Looking Cost

There are three types of cost measures and they answer three different questions:

- What did it cost? This is *embedded* cost.
- What does it cost? This is *forward-looking* cost.
- What might it cost? This is a *speculative* cost.

[1] The only "evidence" of rural ILEC inefficiency is contained in *Lost in Translation*, conducted by ETI on behalf of Western Wireless. I have examined this alleged evidence in *False Premises, False Conclusions* on behalf of NTCA.

The last two should be distinguished. Any forward-looking cost measure inevitably involves some speculation since the costs have not yet been incurred. The degree of speculation differs, however. A forward-looking cost estimate that is based on presumed changes in technology or operating procedures becomes speculative when those technologies or procedures are not being employed today. In the following discussion, I will refer to forward-looking cost as the cost today, using current technology, input prices, and procedures.

Embedded cost and forward-looking cost are both current cost measures: one looks to the past and the other looks to the future, but they are both conducted today. If technology and/or input prices are changing, then the view backwards and forwards will necessarily differ. A simple example makes this clear: if I purchased a computer last year, then its embedded cost will reflect the price I paid for it last year.[2] If technology has been improving, then purchasing a new computer (with equal processing power) today should be cheaper than it was last year. Thus, today's forward-looking cost may be lower than the embedded cost. By the same token, if purchasing a labor-intensive service today (e.g., trenching for laying cable), then today's forward-looking cost may exceed the embedded cost. The two will generally be different, depending on changes in technology and changes in input prices.

Both embedded and forward-looking costs change as network deployment evolves. If technological progress is leading to lower forward-looking costs over time, then embedded costs will also be decreasing over time. The rate of decrease will be muted due to the

[2] Even this simple example becomes complicated quickly. Today's embedded cost will reflect not only the initial purchase price of the computer a year ago, but also the depreciation rate and cost of money applied to the net investment that remains today. Depending on the depreciation rate relative to my replacement decision, the relationship between today's embedded cost and today's forward-looking cost will not be straightforward. I will describe the results of considering these complexities shortly.